

**Space Weather Highlights**  
**24 – 30 April 2006**

**SEC PRF 1600**  
**02 May 2006**

Solar activity was at low to high levels. Region 875 (S10, L=115, class/area, Dki/480 on 25 April) was responsible for the majority of the observed activity. Solar activity reached low levels on 24 and 25 April with only isolated C1 flares from Region 875. On 26 April, Region 875 produced a C9.1/sf at 1453 UTC and an M1.3/1f at 1702 UTC. On the 27th, activity reached high levels as this region produced an M7.9/1n at 1552 UTC. From 28 - 30 April, solar activity decayed to low levels.

No greater than 10 MeV proton events were observed this period.

No greater than 2 MeV electron events were observed this period.

The geomagnetic field ranged from predominantly quiet to active levels. The period began with a solar wind speed of 485 km/s. During this time, conditions were mostly quiet at middle latitudes with quiet to active periods at high latitudes. Solar wind speed continued to diminish to a low of approximately 310 km/s by 27 April with the IMF Bz not varying much beyond  $\pm 5$  nT. Early on 28 April, solar wind speed began to increase with the IMF Bz fluctuating between  $+12 / -9$  nT. During this time, quiet to active conditions were observed at middle and high latitudes with isolated substorming reaching minor to major storm levels. By midday on 28 April through the end of the period, the IMF Bz relaxed to  $\pm 5$  nT while the solar wind slowly decreased to approximately 300 km/s. The geomagnetic field remained quiet during this time.

**Space Weather Outlook**  
**03 May - 29 May 2006**

Solar activity is expected to be at very low to low levels.

No greater than 10 MeV proton events are expected.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 07 – 18 May.

The geomagnetic field is expected to be at quiet to unsettled levels for the majority of the forecast period. Active to major storm conditions are expected on 05 – 07 May due to the effects from a weak CME coupled with a coronal hole wind stream. On 10 – 13 May, active to major storm levels are possible due to a co-rotating interaction region followed by a recurrent coronal hole wind stream. Active to minor storm conditions are expected on 19 May due to the effects from a recurrent coronal hole wind stream.



### *Daily Solar Data*

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10 <sup>-6</sup> hemi.)	X-ray Background	Flares							
					X-ray Flux			Optical				
					C	M	X	S	1	2	3	4
24 April	93	38	580	B1.4	1	0	0	2	0	0	0	0
25 April	95	33	660	B1.7	1	0	0	0	0	0	0	0
26 April	100	60	800	B1.4	6	1	0	3	1	0	0	0
27 April	101	63	550	B1.3	0	1	0	0	1	0	0	0
28 April	100	68	590	B1.3	2	0	0	1	0	0	0	0
29 April	101	64	390	B1.5	2	0	0	1	0	0	0	0
30 April	0	62	470		2	0	0	2	0	0	0	0

### *Daily Particle Data*

Date	Proton Fluence (protons/cm <sup>2</sup> -day-sr)			Electron Fluence (electrons/cm <sup>2</sup> -day-sr)		
	>1 MeV	>10 MeV	>100 MeV	>.6 MeV	>2MeV	>4 MeV
24 April	3.1E+5	1.6E+4	3.8E+3		2.1E+7	
25 April	2.8E+5	1.6E+4	3.7E+3		1.4E+7	
26 April	2.4E+5	1.7E+4	3.8E+3		1.1E+7	
27 April	2.6E+5	1.7E+4	4.0E+3		3.7E+6	
28 April	2.2E+5	1.7E+4	3.9E+3		1.7E+6	
29 April	1.8E+5	1.7E+4	3.7E+3		1.0E+6	
30 April	1.8E+5	1.7E+4	4.0E+3		1.4E+6	

### *Daily Geomagnetic Data*

Date	Middle Latitude		High Latitude		Estimated	
	Fredericksburg		College		Planetary	
	A	K-indices	A	K-indices	A	K-indices
24 April	4	3-1-1-1-1-0-1	7	2-1-3-4-1-0-0-1	7	3-2-2-1-1-2-1-2
25 April	1	2-0-0-0-1-0-0-0	3	1-1-0-0-3-1-0-0	5	3-0-0-0-2-2-2-1
26 April	2	2-1-1-0-0-0-0-0	3	1-2-2-1-0-0-0-0	5	2-2-1-1-1-1-2-1
27 April	3	1-1-0-1-1-2-0-1	5	1-2-2-1-3-1-0-0	5	2-2-1-1-1-2-1-2
28 April	10	3-2-4-2-2-1-2-1	11	2-3-3-4-3-1-1-1	12	3-3-5-2-1-1-2-2
29 April	2	0-1-0-1-1-1-0-0	0	1-0-0-0-0-0-0-0	3	1-0-0-0-1-2-1-1
30 April	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-0	0	0-0-0-0-0-0-0-1

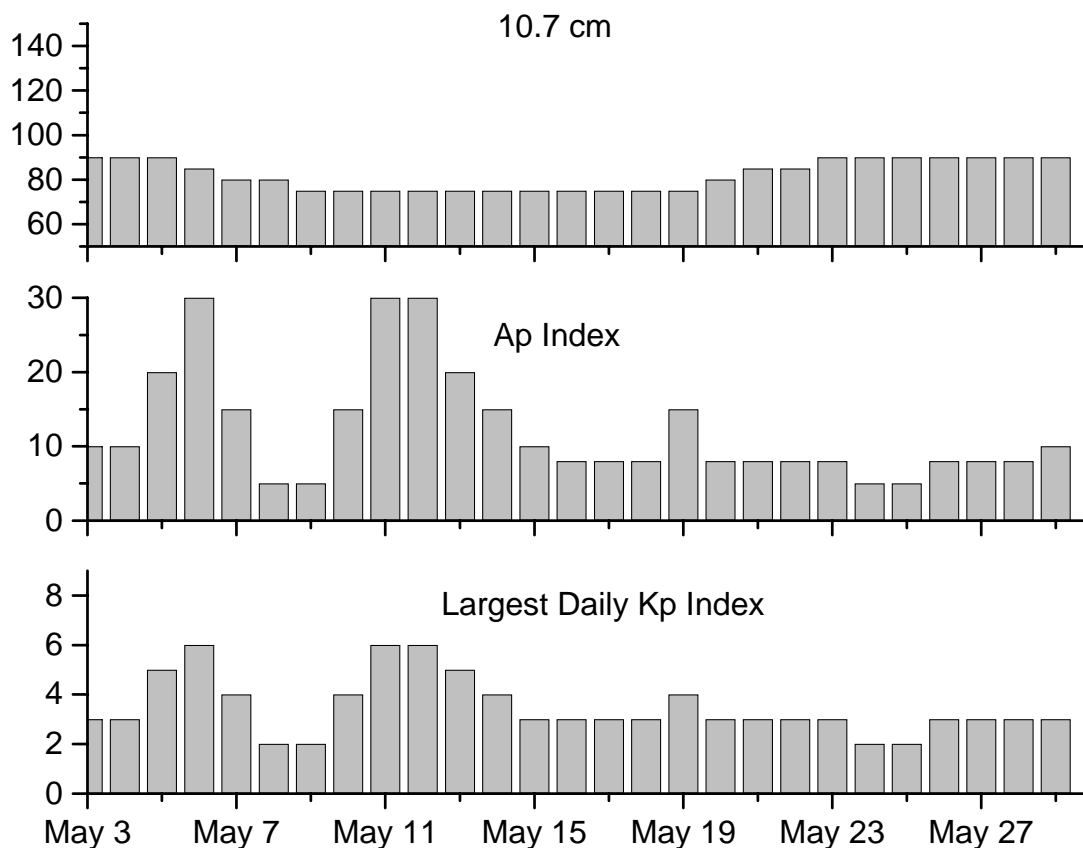


### *Alerts and Warnings Issued*

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
27 Apr 1551	ALERT: X-Ray Flux >M5	27 Apr 1550
27 Apr 1604	SUMMARY: X-ray Flux $\geq$ M5	27 Apr 1552
28 Apr 0608	ALERT: Geomagnetic K=4	28 Apr 0607
28 Apr 0612	ALERT: Geomagnetic K=5	28 Apr 0612
28 Apr 0701	ALERT: Geomagnetic K=6	28 Apr 0701
30 Apr 0531	ALERT: Type II Radio Emission	30 Apr 0139
30 Apr 0547	SUMMARY: 10cm Radio Burst	30 Apr 0156
30 Apr 1250	ALERT: Type II Radio Emission	30 Apr 0921
30 Apr 1539	ALERT: Type II Radio Emission	30 Apr 0921



## Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
03 May	90	10	3	17 May	75	8	3
04	90	10	3	18	75	8	3
05	90	20	5	19	75	15	4
06	85	30	6	20	80	8	3
07	80	15	4	21	85	8	3
08	80	5	2	22	85	8	3
09	75	5	2	23	90	8	3
10	75	15	4	24	90	5	2
11	75	30	6	25	90	5	2
12	75	30	6	26	90	8	3
13	75	20	5	27	90	8	3
14	75	15	4	28	90	8	3
15	75	10	3	29	90	10	3
16	75	8	3				



### ***Energetic Events***

Date	Time			X-ray		Optical Information			Peak		Sweep Freq	
			$\frac{1}{2}$			Imp/	Location		Radio Flux		Intensity	
	Begin	Max	Max	Class	Flux	Brtns	Lat	CMD	#	245	2695	II IV
26 Apr 06	1651	1702	1710	M1.3	.008	1f	S11E38		875			
27 Apr 06	1522	1552	1558	M7.9	.037	1n	S11E21		875			

### ***Flare List***

Date	Time			Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
24 April	0030	0033	0035	B2.5			875
	0356	0404	0413	C1.0			875
	0901	0903	0905		Sf	S07E68	875
	0906	0908	0921		Sf	S08E68	875
	0935	0938	0941	B3.9			875
	0949	0952	0957	B3.8			875
	1440	1445	1451	B4.2			875
	1628	1631	1633	B2.7			875
25 April	0152	0213	0236	B6.0			875
	0636	0726	0812	C1.3			875
	1431	1436	1440	B4.8			875
	1543	1606	1622	B4.2			875
	1700	1706	1717	B2.9			876
26 April	0443	0446	0448	B3.7			875
	0603	0604	0607	B4.5	Sf	S10E45	875
	0627	0630	0632	B4.0			875
	0638	0646	0651	C1.0			875
	0718	0721	0724	B3.3			
	0738	0743	0750	B5.0			875
	0815	0819	0823	B3.0			875
	0826	0831	0838	B8.3			875
	1005	1008	1010	B3.0			
	1105	1111	1118	B4.4			875
	1212	1226	1234	C1.2			875
	1251	1254	1257	B3.7			875
	1319	1329	1333	B3.7			
	1349	1353	1417	C7.7	Sf	S10E38	875
	1436	1454	1524	C9.1	Sf	S07E39	875
	1702	1702	1733	M1.3	1f	S11E38	875
	1817	1827	1832	C2.6			875
	2051	2108	2117	C3.6			875



***Flare List-Continued***

Date	Time			Optical	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End	X-ray Class.			
27 April	0344	0349	0404	B4.3			875
	0431	0435	0437	B2.5			875
	0450	0453	0456	B5.1			875
	1222	1302	1315	B4.9			
	1547	1550	1653	M7.9	1n	S11E21	875
28 April	0257	0301	0304	B2.9			875
	0325	0341	0348	B5.0			875
	0736	0747	0803	B4.0			875
	0822	0822	0839	C1.9	Sf	S07E16	875
	2049	2053	2056	B3.6			
29 April	2323	2336	2352	C2.3			
	0612	0616	0621	B3.6			
	1615	1631	1645	C2.3			
	1827	1852	1905	C1.1			875
	1834	1834	1839		Sf	S05W05	875
30 April	2103	2140	2201	B4.1			
	2232	2236	2239	B3.3			876
	2314	2320	2326	B5.7			875
	B0203	U0203	0209	C5.3	Sf	N15E71	
	0325	0332	0335	B3.5			875
	0917	0926	0939	C1.8	Sf	S10E09	876
	2356	0001	0016	B2.0			



### Region Summary

Region Summary															
Location			Sunspot Characteristics												
Date	( ° Lat ° CMD)	Helio Lon	Flares												
			Area (10 <sup>-6</sup> hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	X-ray			Optical				
								C	M	X	S	1	2	3	4

#### Region 874

18 Apr N00E15	238	0010	02	Hsx	003	A
19 Apr N00E02	238	0020	06	Cao	004	B
20 Apr S01W11	238	0060	05	Dao	009	B
21 Apr S01W25	238	0030	04	Dro	004	B
22 Apr S02W39	239	0010	04	Bxo	005	B
23 Apr S01W55	242	0000	01	Axx	001	A
24 Apr S01W68	242					
25 Apr S01W81	242					

0 0 0 0 0 0 0 0

Crossed West Limb.

Absolute heliographic longitude: 238

#### Region 875

23 Apr S11E71	116	0270	11	Cao	003	B
24 Apr S10E62	112	0430	10	Dkc	016	Bg
25 Apr S10E46	115	0480	08	Dki	009	Bgd
26 Apr S10E34	114	0470	08	Dki	021	Bg
27 Apr S11E20	114	0310	07	Cai	021	Bg
28 Apr S11E06	115	0380	08	Dac	023	Bg
29 Apr S09W07	115	0280	08	Dkc	031	Bg
30 Apr S08W21	116	0340	11	Eki	020	Bg

10 2 0 7 2 0 0 0

Still on Disk.

Absolute heliographic longitude: 115

#### Region 876

24 Apr S14E80	094	0150	01	Hax	002	A
25 Apr S16E69	092	0180	09	Dao	004	B
26 Apr S16E57	091	0290	11	Dko	007	Bg
27 Apr S16E54	080	0230	10	Dso	011	Bg
28 Apr S15E30	091	0200	11	Eai	013	B
29 Apr S14E18	090	0110	11	Eai	013	B
30 Apr S11E08	087	0070	10	Cao	009	Bg

1 1  
1 0 0 1 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 087



### *Region Summary-Continued*

Region Summary Continued																
Location			Sunspot Characteristics													
			Flares													
Helio			Area	Extent	Spot	Spot	Mag	X-ray			Optical					
Date	( ° Lat ° CMD)	Lon	(10 <sup>-6</sup> hemi)	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4	

#### *Region 877*

26 Apr	S07E52	096	0040	01	Hrx	002	A
27 Apr	S07E40	094	0010	01	Axx	001	A
28 Apr	S05E24	097	0010	01	Axx	002	A
29 Apr	S05E11	097	0000	00		000	
30 Apr	S05W02	097	0000	00		000	

0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 097

#### *Region 878*

30 Apr	N14E60	035	0060	02	Bxo	003	B
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0 0 0 0 0 0 0 0

Still on Disk.

Absolute heliographic longitude: 035



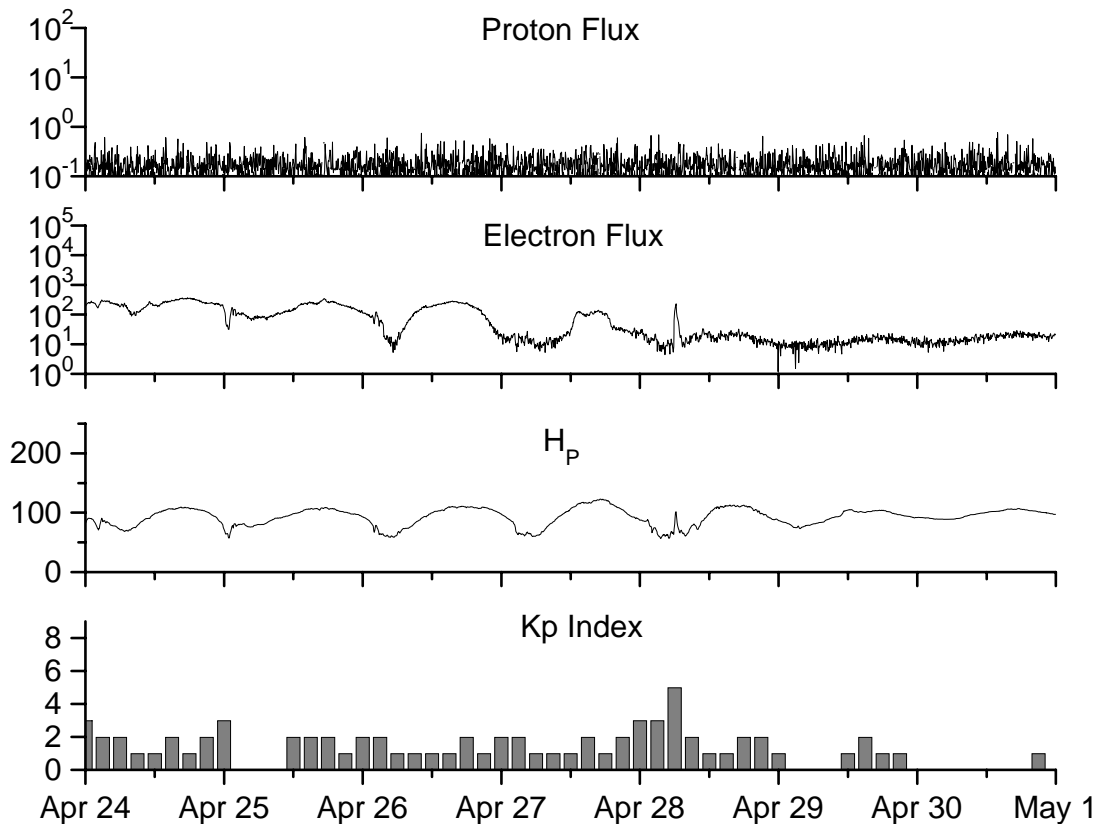


**Recent Solar Indices (preliminary)  
of the observed monthly mean values**

Month	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		*Penticton	Smooth	Planetary	Smooth
	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
2004									
April	59.3	39.3	0.66	77.9	45.6	101.2	112.3	11	15.5
May	77.3	41.5	0.54	74.1	43.9	99.8	109.2	8	14.3
June	78.9	43.2	0.55	70.4	41.7	97.4	107.2	8	14.0
July	87.8	51.0	0.58	68.3	40.2	118.5	105.9	23	13.8
August	69.5	40.9	0.59	66.6	39.3	110.1	105.0	11	13.8
September	50.0	27.7	0.55	63.7	37.6	103.1	103.7	10	13.6
October	77.9	48.4	0.62	61.3	35.9	105.7	102.1	9	13.5
November	70.5	43.7	0.62	60.0	35.4	113.2	101.5	26	14.1
December	34.7	17.9	0.52	58.8	35.3	94.6	101.3	11	14.8
2005									
January	52.0	31.3	0.60	57.3	34.7	102.4	100.3	22	14.7
February	45.4	29.1	0.64	56.4	34.0	97.3	98.5	11	14.6
March	41.0	24.8	0.60	55.8	33.6	90.0	97.2	12	15.3
April	41.5	24.4	0.59	52.6	31.7	85.9	95.5	12	15.7
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	42.9	25.9	96.6	87.8	16	11.8
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56			90.8		21	
October	13.0	8.5	0.65			76.7		7	
November	32.2	18.0	0.56			86.3		8	
December	62.6	41.2	0.66			90.8		7	
2006									
January	28.0	15.4	0.55			83.8		6	
February	5.3	4.7	0.89			76.6		6	
March	21.3	10.8	0.51			75.5		8	

**NOTE:** All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000. \*After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.





*Weekly Geosynchronous Satellite Environment Summary*  
*Week Beginning 24 April 2006*

*Protons* plot contains the five-minute averaged integral proton flux (protons/cm<sup>2</sup>-sec-sr) as measured by GOES-11 (W114) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

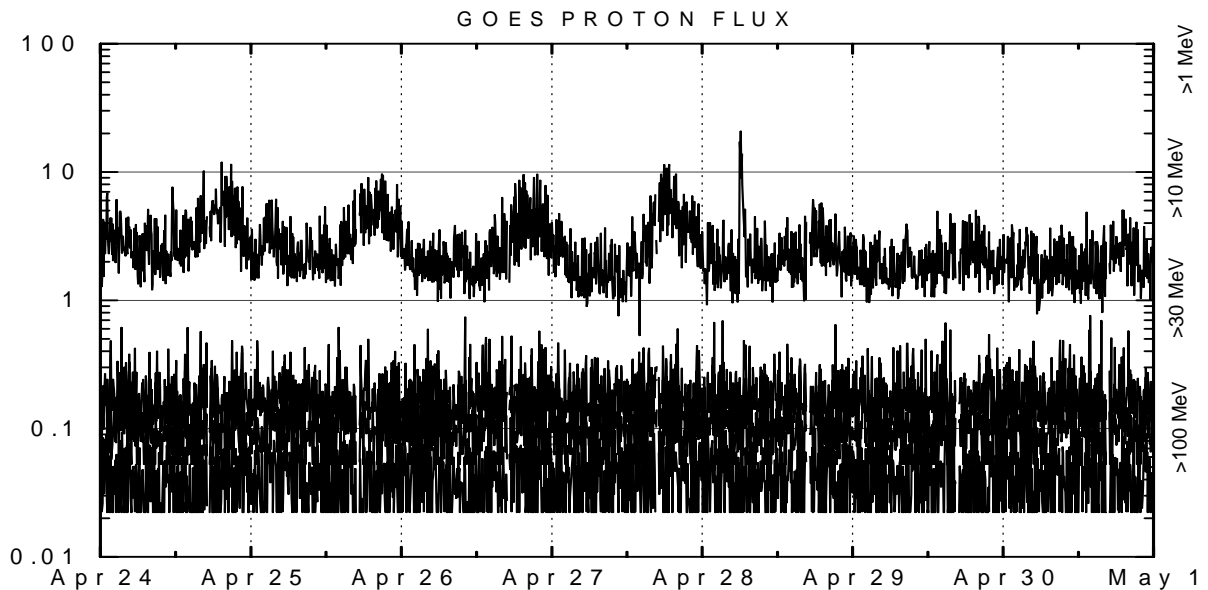
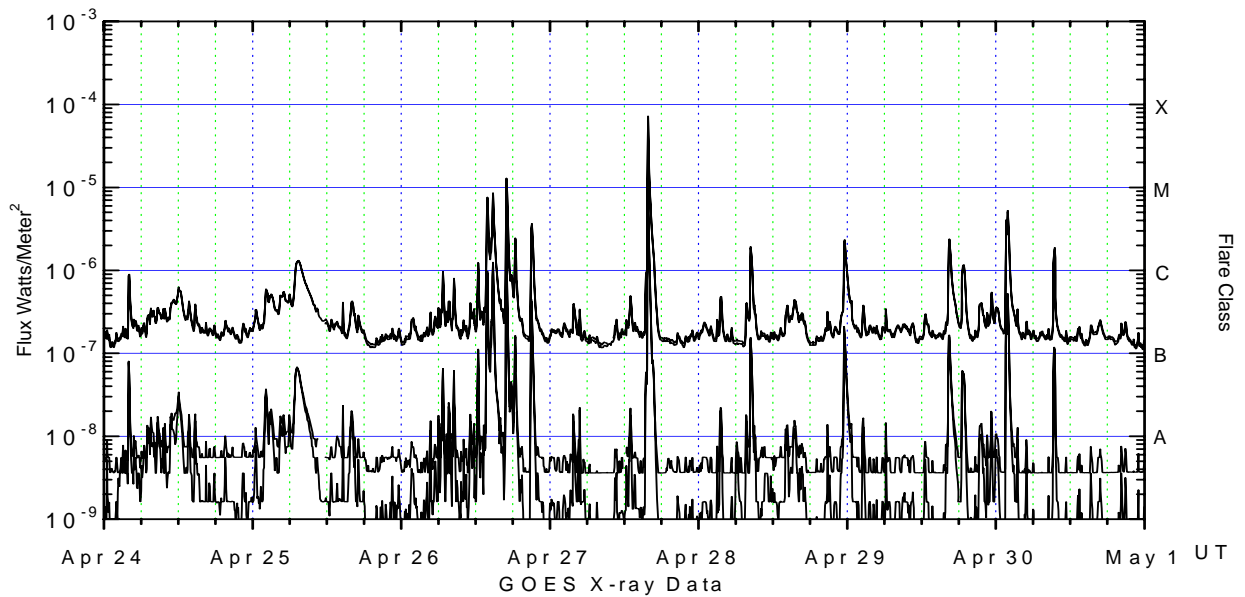
*Electrons* plot contains the five-minute averaged integral electron flux (electrons/cm<sup>2</sup>-sec-sr) with energies greater than 2 MeV at GOES-12 (W75).

*H<sub>p</sub>* plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

*K<sub>p</sub>* plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final K<sub>p</sub> values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SEC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and K<sub>p</sub> are "global" parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





#### Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux ( $\text{watts/m}^2$ ) as measured by GOES 12 (W75) and GOES 10 (W134) in two wavelength bands, .05 - .4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux ( $\text{protons/cm}^2\text{-sec-sr}$ ) as measured by GOES-11 (W114) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu ( $\text{protons/cm}^2\text{-sec-sr}$ ) at greater than 10 MeV.





Space  
Environment  
Center

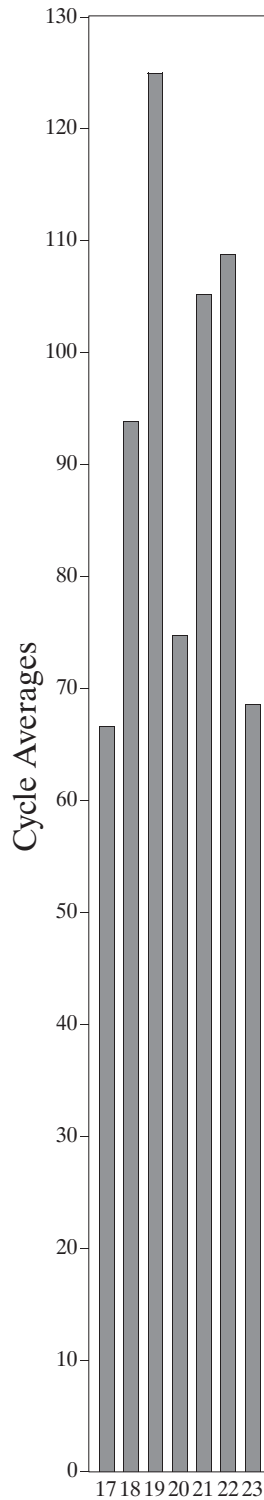
# Sunspot Number (RI)

March 2006  
(Month 114)

Preliminary data



Comparison of Cycles  
at current month in cycle



K. Tegnell

Cycle

Monthly Averages

